IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A display ~~device~~ apparatus for generating a three-dimensional volumetric image, comprising:

a two-dimensional image display panel ~~(41, 46)~~ for generating a two-dimensional image;

a first focusing element ~~(42, 47)~~ for projecting the two-dimensional image to a virtual image ~~(40, 45)~~ in an imaging volume ~~(44, 49)~~; and

a means ~~(53, 120, 150)~~ for altering ~~the~~ an effective optical path length between the display panel and the projecting first focusing element so as to alter the position of the virtual image within the imaging volume, wherein the means for altering the effective optical path length includes an optical path length adjuster for varying an effective optical path length between an input optical path ~~(52)~~ and an output optical path ~~(54)~~, the

optical path length adjuster comprising:

~~a first polarisation switch (160) for selecting a polarisation state for an input beam on the input optical path (52); and~~

~~an optical element (141, 161, 201) having birefringent properties and thereby defining at least two possible effective optical paths of different lengths therethrough, for passing the input beam along a selected one of said at least two possible optical paths according to the selected polarisation state of the input beam and for providing an output beam of light, on said optical output path (54), that has travelled along the selected optical path~~

a first beam splitter configured with a first optical input coupled to an optical output of a first polarization switch that is inserted in the input optical path, the first beam splitter configured for diverting a light incident at the first optical input to a first and a second optical output respectively according to a polarization state of the incident light at the first optical input of the first beam splitter;

a second beam splitter configured with a first and a second optical input respectively that are optically coupled to the first and second outputs of the first beam splitter, via a first and a

second optical path respectively, the second beam splitter configured for diverting light incident at the second beam splitters first and second inputs to a first and a second output of the second beam splitter according to a polarization state of the incident light at the first and second inputs of the second beam splitter,

wherein the first output of the second beam splitter defines the output optical path, and the second output of the second beam splitter is optically coupled to a second input of the first beam splitter via a third optical path,

wherein each of the first, second and third optical paths respectively includes one of a second, a third and a fourth polarization switch, and

wherein the first, second, third and fourth polarization switches are adapted to select cumulative combinations of one or more of the first, second, and third optical paths between the input optical path and the output optical path.

2. (Currently amended) The apparatus of claim 1, wherein ~~in which the~~the first, second, third, and fourth polarization switches are each birefringent optical ~~element (161) has its~~ elements that

each have optic axis orthogonal to the optical axis defined by ~~the~~ respective input path ~~(52) and the~~ output ~~path (54)~~ paths.

3. (Currently amended) The apparatus of claim 1, ~~further including an~~comprising a birefringent optical element ~~(165), 201)~~ for at least partially correcting for astigmatism.

4. (Currently amended) The apparatus of claim 3, wherein ~~in which~~ the birefringent optical element ~~(165)~~ includes a cylindrically-shaped optical surface for correcting for astigmatism.

5. (Currently amended) The apparatus of claim 4, wherein ~~in which~~ the birefringent optical element ~~(165)~~ further includes a fitting, non-birefringent counterpart element ~~(166)~~ attached to the cylindrically-shaped optical surface.

6. (Currently amended) The apparatus of claim 5, wherein ~~in which~~ the counterpart element ~~(166)~~ has a refractive index substantially equal to the ordinary index of refraction of the birefringent element ~~(165)~~.

7. (Currently amended) The apparatus of claim 3, wherein ~~in which~~ the birefringent optical element comprises a spherical lens ~~(201)~~.

8. (Currently amended) The apparatus of claim 7, wherein ~~in which~~ the spherical lens is a plano-convex lens ~~(201)~~.

9. (Currently amended) The apparatus of claim 1, ~~further including an~~comprising a birefringent optical element for at least partially correcting for spherical aberration.

10. (Currently amended) The apparatus of claim 9, wherein ~~in which~~ the birefringent optical element is a cylindrically corrected plane-parallel plate and in which the spherical aberration correction element is a spherical lens.

11. (Currently amended) The apparatus of claim 9, wherein ~~in which~~ the birefringent optical element is a spherical lens and in which the spherical aberration correction element is a plane-parallel plate.

12. (Currently amended) The apparatus ~~(53, 150)~~ of claim 1, comprising ~~combined with~~ at least one further optical path length adjuster ~~(53, 150) of any preceding claim~~ in a cascade formation, such that the output optical path ~~(54)~~ of the ~~first said~~ optical path length adjuster ~~(150)~~ forms the input path ~~(52)~~ of a successive ~~said~~ further optical path length adjuster ~~(53, 150)~~.

13. (Currently amended) The apparatus of claim 12, wherein ~~in which~~ the optical paths of each said optical path length adjuster ~~(53, 150)~~ include different optical path lengths such that a plurality of possible overall optical path lengths are selectable by appropriate selection of path length within each said optical path length adjuster.

14. (Currently amended) The apparatus of claim 13, wherein ~~in which~~ each successive optical path length adjuster in the cascade has a thickness of birefringent optical element which is different from any other birefringent optical element in the cascade.

15. (Currently amended) The apparatus of claim 1, comprising ~~including~~ a further optical path length adjuster in a cascade formation, such that the output optical path of the optical path length adjuster forms the input path of the further optical path length adjuster, the further optical path length adjuster comprising:

a first ~~polarisation~~ polarization switch ~~(60)~~ for selecting a ~~polarisation~~ polarization state for an input beam on an input optical path ~~(52)~~ of the further optical path length adjuster; and

first and second beam splitters ~~(61, 62, 105, 106) having~~ comprising at least two possible optical paths ~~(63, 64, 110, 111, 112)~~ of different lengths therebetween, for passing the input beam along a selected one of said at least two possible optical paths according to the selected ~~polarisation~~ polarization state of the input beam and for providing an output beam of light, on an optical output path ~~(54)~~ of the further optical path length adjuster, that has ~~travelled~~ traveled along the selected optical path.

16. (Currently amended) ~~The~~ An apparatus ~~of claim 15 in which the~~ comprising:

a first polarization switch comprising an input optical path and an optical output;

a first beam splitter ~~(105) has~~ comprising a first optical input ~~(105a)~~ coupled to the optical output of the first ~~polarisation~~ polarization switch ~~(101)~~, ~~for~~ the first beam splitter being configured for diverting light incident at the first optical input of the first beam splitter to first and second optical outputs ~~(105b, 105c)~~ respectively according to a ~~polarisation~~ polarization state of the incident light at the first optical input of the first beam splitter;

~~the~~ a second beam splitter ~~(106) has~~comprising first and second optical inputs ~~(106a, 106b)~~ respectively optically coupled to the first and second outputs ~~(105b, 105c)~~ of the first beam splitter ~~(105)~~, via respective said first and second optical paths ~~(110, 111)~~, the second beam splitter ~~(106)~~ being configured for diverting light incident at the second beam splitters first and second inputs ~~(106a, 106b)~~ to first and second outputs ~~(106c, 106d)~~ of the second beam splitter ~~(106)~~ according to a ~~polarisation~~ polarization state of the incident light at the first and second inputs ~~thereof;~~ of the second beam splitter,

wherein the first output ~~(106c)~~ of the second beam splitter

~~(106)~~ defines ~~the~~ an optical output path ~~(54)~~, and the second output ~~(106d)~~ of the second beam splitter is optically coupled to a second input ~~(105d)~~ of the first beam splitter ~~(105)~~ via a third optical path, ~~(112),~~

wherein each of the first, second and third optical paths ~~(110, 111, 112)~~ respectively includes one of a second, a third and a fourth ~~polarisation~~ polarization switch, and ~~(104, 102, 103),~~

wherein the first, second, third and fourth ~~polarisation~~ polarization switches are adapted to ~~thereby~~ select cumulative combinations of one or more of ~~said~~ the first, second, and third optical paths between the input optical path ~~(52)~~ and the output optical path ~~(54)~~.

17. (Currently amended) The display ~~device~~ apparatus of claim 3, wherein ~~in which~~ the display panel ~~(51)~~ is positioned at a distance from the birefringent optical element ~~(141, 161, 201)~~ such that astigmatic aberration is substantially ~~minimised~~ or eliminated.

18. (Currently amended) The display ~~device~~ apparatus of claim 3 in which the display panel ~~(51)~~ is positioned at a distance

from the birefringent optical element ~~(141, 161, 201)~~ such that spherical aberration is at least substantially ~~minimised or eliminated~~minimized.

19. (Currently amended) The display ~~device~~ apparatus of claim 9, wherein ~~in which~~ the display panel ~~(51)~~, the birefringent optical element ~~(141, 161, 201)~~ and the spherical aberration correction element ~~(203, 205)~~ are relatively positioned such that spherical aberration is at least substantially ~~minimised or eliminated~~ minimized.

20. (Currently amended) A method for generating a three-dimensional volumetric image, comprising the ~~steps~~ acts of:

generating a two-dimensional image on a two-dimensional image display panel ~~(41, 46)~~;

projecting the two-dimensional image to a virtual image ~~(40, 45)~~ in an imaging volume ~~(44, 49)~~ with a first focusing element ~~(42, 47)~~; and

altering the optical path length between the display panel and the projecting focusing element so as to vary the position of the virtual image within the imaging volume by varying an effective

optical path length between an input optical path ~~(52)~~ and an output optical path ~~(54)~~ of an optical path length adjuster ~~(53, 150, 120)~~ positioned between the display panel and the projecting focusing element, ~~comprising the steps~~ wherein the act of altering the optical path length comprises acts of:

selecting a ~~polarisation~~ polarization state for an input beam of light on the input optical path using a first ~~polarisation~~ polarization switch~~(160)~~;

passing the input beam into ~~an optical element having birefringent properties and thereby defining at least two possible effective optical paths of different lengths therethrough, the input beam traveling along a selected one of said at least two possible effective optical paths according to the selected polarisation state of the input beam;~~ a first beam splitter configured with a first optical input coupled to an optical output of the first polarization switch that is inserted in the input optical path, the first beam splitter configured for diverting the input beam at the first optical input to a first and a second optical output respectively according to a polarization state of the input beam at the first optical input of the first beam splitter;

receiving the input beam at a second beam splitter configured with a first and a second optical input respectively that are optically coupled to the first and second outputs of the first beam splitter, via a first and a second optical path respectively, the second beam splitter configured for diverting the input beam light incident at the second beam splitters first and second inputs to a first and a second output of the second beam splitter according to a polarization state of the incident light at the first and second inputs of the second beam splitter,

wherein the first output of the second beam splitter defines the output optical path, and the second output of the second beam splitter is optically coupled to a second input of the first beam splitter via a third optical path,

wherein each of the first, second and third optical paths respectively includes one of a second, a third and a fourth polarization switch;

controlling the polarization of the first, second, third and fourth polarization switches to select cumulative combinations of one or more of the first, second, and third optical paths between the input optical path and the output optical path; and

providing an output beam of light, from the ~~birefringent~~

~~optical element on said~~ optical path length adjuster to ~~the~~ an optical output path ~~(54)~~.

21. (Currently amended) The method of claim 20, comprising an act ~~further including the step~~ of at least partially correcting for astigmatism.

22. (Currently amended) The method of claim 20, comprising an act ~~further including the step~~ of at least partially correcting for spherical aberration.

23. (Currently amended) The method of claim 20, comprising an act ~~further including the step act~~ of passing the beam through at least one further optical path length adjuster such that the output optical path ~~(54)~~ of the ~~first said~~ optical path length adjuster ~~(150)~~ forms the input path ~~(52)~~ of a successive ~~said~~ further optical path length adjuster ~~(53, 150)~~, and selecting optical path length using each optical path length adjuster.

24. (Currently amended) The method of claim 20, comprising an act ~~further including the step~~ of positioning the optical path

length adjuster at a distance from an object to be imaged so as to ~~minimise~~ minimize astigmatic aberration.

25. (Currently amended) The method of claim 20, comprising an act ~~further including the step~~ of positioning the optical path length adjuster relative to an object to be imaged so as to ~~minimise~~ minimize spherical aberration.

26. (Currently amended) The method of claim 23, comprising an act ~~further including the step~~ of selecting different optical path lengths within each said optical path length adjuster ~~(53a, 53b)~~.

27. (New) The apparatus of claim 16, wherein the first, second, third, and fourth polarization switches each have optic axis orthogonal to the optical axis defined by respective input path and output paths, the apparatus comprising a birefringent optical element for at least partially correcting for astigmatism.

28. (New) The apparatus of claim 27, wherein the birefringent optical element includes a cylindrically-shaped

optical surface for correcting for astigmatism, and

wherein the birefringent optical element comprises a fitting, non-birefringent counterpart element attached to the cylindrically-shaped optical surface.

29. (New) The apparatus of claim 27, wherein the birefringent optical element further includes an optical element for at least partially correcting for spherical aberration.